

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2006/310642

A. CLASSIFICATION OF SUBJECT MATTER

C09D201/00(2006.01)i, C08G73/10(2006.01)i, C09D179/00(2006.01)i,
C09D179/08(2006.01)i, C09K11/06(2006.01)i, H01L51/50(2006.01)i

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

C09D1/00-C09D201/10, C08G73/10, C09K11/06, H01L51/50

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Jitsuyo Shinan Koho 1922-1996 Jitsuyo Shinan Toroku Koho 1996-2006
Kokai Jitsuyo Shinan Koho 1971-2006 Toroku Jitsuyo Shinan Koho 1994-2006

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

CA(STN), CAOLD(STN), CAPLUS(STN), WPI(DIALOG), JAPICDOC(JDREAM2),
JCATALOG(JDREAM2), JCHEMA(JDREAM2), JMEDPLUS(JDREAM2), JST7580(JDREAM2),

C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-----------|---|-----------------------|
| X Y | WO 02/100949 A1 (Nissan Chemical Industries, Ltd.), 19 December, 2002 (19.12.02), Full text & EP 1403325 A1 & KR 2004007634 A & US 2004/0167314 A1 & JP 2003-503710 A & CN 1514857 A | 1-6, 15, 16 7-14 |
| X Y | JP 6-338392 A (Toppan Printing Co., Ltd.), 06 December, 1994 (06.12.94), Full text (Family: none) | 1-6, 15, 16 7-14 |
| X Y | US 2003/0097003 A1 (Lindsay et al.), 22 May, 2003 (22.05.03), Full text (Family: none) | 1-4, 15, 16 5-14 |

☒ Further documents are listed in the continuation of Box C.☐ See patent family annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search
22 August, 2006 (22.08.06)

Date of mailing of the international search report
05 September, 2006 (05.09.06)

Name and mailing address of the ISA/
Japanese Patent Office

Authorized officer

Facsimile No.

Telephone No.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2006/310642

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-------------|--|----------------------------|
| X Y | US 2003/0105270 A1 (Lindsay et al.), 05 June, 2003 (05.06.03), Full text (Family: none) | 1-4, 15, 16 7-14 |
| X Y | GUEY-SHENG LIOU et al., Synthesis and Properties of New Aromatic Poly(amino-imide)s Derived from N, N'-diphenyl-1, 4-phenylenediamine, JOURNAL OF POLYMER SCIENCE PART. A Polymer Chemistry. 01 November, 2002 (01.11.02), Vol.40, No.21, pages 3815 to 3822. | 1-4, 15, 16 5-14 |
| X Y | B.V.Kotov et al., Photogeneration and photovoltaic properties of polyimides with extended charge delocalisation in polymer chains, Synthetic Metals, 15 March, 2001 (15.03.01), Vol.121, Nos.1 to 3, pages 1553 to 1554 | 1-4, 15, 16 7-14 |
| X A | JP 2005-93427 A (Mitsubishi Chemical Corp.), 07 April, 2005 (07.04.05), Full text (Family: none) | 1-4, 7-16 5-6 |
| X A | JP 2005-93428 A (Mitsubishi Chemical Corp.), 07 April, 2005 (07.04.05), Full text (Family: none) | 1-4, 7-16 5-6 |
| X A | JP 10-308280 A (Minolta Co., Ltd.), 17 November, 1998 (17.11.98), Full text (Family: none) | 1-4, 15, 16 5-6 |
| X Y A | JP 2005-41915 A (Fuji Xerox Co., Ltd.), 17 February, 2005 (17.02.05), Full text (Family: none) | 1-4, 15, 16 7-14 5-6 |
| X Y A | JP 11-135262 A (Mitsubishi Chemical Corp.), 21 May, 1999 (21.05.99), Full text (Family: none) | 1-4, 15, 16 7-14 5-6 |
| X Y A | JP 2001-247525 A (Ricoh Co., Ltd.), 11 September, 2001 (11.09.01), Full text (Family: none) | 1-4, 15, 16 7-14 5-6 |
| X Y A | JP 2003-77668 A (Ricoh Co., Ltd.), 14 March, 2003 (14.03.03), Full text (Family: none) | 1-4, 15, 16 7-14 5-6 |

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2006/310642

C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages | Relevant to claim No. |
|-------------|---|----------------------------|
| X Y A | JP 2005-75948 A (Mitsubishi Chemical Corp.), 24 March, 2005 (24.03.05), Full text (Family: none) | 1-4, 15, 16 7-14 5-6 |
| X Y A | JP 2004-2740 A (Mitsubishi Chemical Corp.), 08 January, 2004 (08.01.04) Full text (Family: none) | 1-4, 15, 16 7-14 |
| Y | WO 03/071559 A1 (Nissan Chemical Industries, Ltd.), 28 August, 2003 (28.08.03), Full text & EP 1477993 A1 & KR 2004096581 A & US 2005/0082514 A1 & JP 2003-570369 A & TW 200400243 A & CN 1639805 A | 7-14 |
| Y | JP 2005-108828 A (Nissan Chemical Industries, Ltd.), 21 April, 2005 (21.04.05), Full text (Family: none) | 7-14 |

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2006/3010642

Continuation of B. FIELDS SEARCHED

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

JSTPlus (JDream2)

Minimum documentation searched (classification system followed by classification symbols)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2006/310642

Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

See extra sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest
the

- ☐ The additional search fees were accompanied by the applicant's protest and, where applicable, payment of a protest fee..
- ☐ The additional search fees were accompanied by the applicant's protest but the applicable protest fee was not paid within the time limit specified in the invitation.
- ☒ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2006/310642

Continuation of Box No. III of continuation of first sheet (2)

(A) Claims 1-16

(B) Reason

"Charge-transporting varnishes characterized by comprising a solution or dispersion of at least one charge-transporting polymer comprising repeating units represented by the general formula (1) in at least one solvent" have already been known in the technical field as disclosed in the following documents D01 to D15:

(1)

(wherein Ar^1 to Ar^7 and X^1 to X^4 are each a group prescribed in claim 1 and n, i and j are each a number prescribed in claim 1).

Further, documents D01 to D6 disclose that the polymer is a polyimide precursor or a polyimide, while document D07 to D11 disclose that charge-transporting polymers such as polyaniline or aromatic polyamines are useful as the component of varnish.

Additionally, documents D16 to D17 disclose use of the prescribed charge-transporting oligoaniline derivatives in charge-transporting varnishes, while addition of charge-receiving dopants to charge-transporting varnishes is well-known art as disclosed in documents D01 to D17 (since the description does not include any particular example as to the inventions of claims 7 to 14, the inventions are considered as being inadequately disclosed within the meaning of PCT Article 5 and lacking the support within the meaning of PCT Article 6).

Thus, it is apparent that at least the inventions of claims 1 to 3 and 7 to 9 are not novel and/or do not involve an inventive step. Consequently, the technical features of the claims do not correspond to "special technical features" within the meaning of PCT Rule 13.2, second sentence.

Therefore, the claim of this international application involves at least the following 12 dependent linkage groups of inventions, among which there is no technical relationship involving one or more of the same or corresponding "special technical features" and which are not so linked as to form a single general inventive concept.

·dependent linkage group 1 (main invention): claims 1, 2, 3, 4, 15, 16

·dependent linkage group 2 (the second invention): claims 1, 2, 3, 5, 15, 16

·dependent linkage group 3 (the third invention): claims 1, 2, 3, 6, 15, 16

·dependent linkage group 4 (the fourth invention): claims 1, 2, 3, 15, 16

·dependent linkage group 5 (the fifth invention): claims 1, 2, 15, 16

·dependent linkage group 6 (the sixth invention): claims 1, 15, 16

·dependent linkage group 7 (the seventh invention): claims 7, 8, 9, 10, 11, 15, 16

(continued to the next page)

INTERNATIONAL SEARCH REPORT

International application No.

PCT/JP2006/310642

- dependent linkage group 8 (the eighth invention): claims 7, 8, 9, 11, 15, 16
- dependent linkage group 9 (the ninth invention): claims 7, 8, 9, 12, 13, 14, 15, 16
- dependent linkage group 10 (the tenth invention): claims 7, 8, 9, 15, 16
- dependent linkage group 11 (the eleventh invention): claims 7, 8, 15, 16
- dependent linkage group 12 (the twelfth invention): claims 7, 15, 16

Documents

- D01: WO 02/100949 A1 (Nissan Chemical Industries, Ltd.) 19 December, 2002 (19.12.02)
- D02: JP6-338392A (Toppan Printing Co., Ltd.) 06 December, 1994 (06.12.94)
- D03: US 2003/0097003 A1 (Lindsay et al.) 22 May, 2003 (22.05.03)
- D04: US 2003/0105270 A1 (Lindsay et al.) 05 June, 2003 (05.06.03)
- D05: GUEY-SHENG LIOU et al,
Synthesis and Properties of New Aromatic Poly(amino-imide)s Derived from N,N'-diphenyl-1,4-phenylenediamine,
JOURNAL OF POLYMER SCIENCE PART. A Polymer Chemistry,
01 November, 2002 (01.11.02), Vol.40, No.21, page. 3815-3822,
- D06: B.V. Kotov et al,
Photogeneration and photovoltaic properties of polyimides with extended charge delocalisation in polymer chains,
Synthetic Metals, 15 March, 2001 (15.03.01), Vol.121, No. 1-3, page.1553-1554,
- D07: JP2005-93427A (Mitsubishi Chemical Corp.) 07 April, 2005 (07.04.05)
- D08: JP2005-93428A (Mitsubishi Chemical Corp.) 07 April, 2005 (07.04.05)
- D09: JP 10-308280 A (Minolta Co., Ltd.) 17 November, 1998 (17.11.98)
- D10: JP 2005-41915 A (Fuji Xerox Co., Ltd.) 17 February, 2005 (17.02.05)
- D11: JP 11-135262 A (Mitsubishi Chemical Corp.) 21 May, 1999 (21.05.99)
- D12: JP 2001-247525 A (Ricoh Co., Ltd.) 11 September, 2001 (11.09.01)
- D13: JP 2003-77668 A (Ricoh Co., Ltd.) 14 March, 2003 (14.03.03)
- D14: JP2005-75948A (Mitsubishi Chemical Corp.) 24 March, 2005 (24.03.05)
- D15: JP 2004-2740 A (Mitsubishi Chemical Corp.) 08 January, 2004 (08.01.04)
- D16: WO 03/071559 A1 (Nissan Chemical Industries, Ltd.) 28 August, 2003 (28.08.03)
- D17: JP 2005-108828 A (Nissan Chemical Industries, Ltd.) 21 April, 2005 (21.04.05)

<Opinion on the international application>

The "charge-transporting varnish comprising a solution or dispersion of both a charge-transporting substance consisting of a prescribed oligoaniline derivative and at least one charge-transporting polymer comprising repeating units of the general formula (1) in at least one solvent" set forth in claims 7 to 14 and claims 15 to 16 referring to claims 7 to 14 is not disclosed within the meaning of PCT Article 5 and therefore lacks the support within the meaning of PCT Article 6, because the description does not include any particular example of the varnish.